Commercial banking transformed by computer technology

Banks increasingly use computers to reduce costs and offer additional services to customers; however, technology and the trend toward mergers and consolidations have resulted in fewer banking jobs

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Commercial banking is evolving into a highly competitive and technologically innovative industry—and is managing growing assets with fewer workers. This transformation began in 1980, when interest rates were deregulated. As competition for depositors increased, so did the number of bank failures and mergers. To better compete in a changing market, banks use computer technology to provide new services and attract customers. One of the most significant technological investments made by commercial banks is the automated teller machine (ATM). ATM's introduced the power of computer technology to the general public and made banking convenient for consumers. Today, ATM's deliver banking services 24 hours a day, 7 days a week to more than 22 million people in the United States.[1]

Bank failures and merger activity have contributed to employment declines; however, computer technology in the form of ATM's may have contributed as well. This article discusses how commercial banks cut costs and offer new services through the use of ATM and other computer technology. The role of technology in reducing employment is analyzed, along with the trend toward mergers and consolidations and competition from non-bank institutions.

Economic climate

Productivity increases. According to a recent Bureau of Labor Statistics study of industry productivity trends, productivity in commercial banks increased 10.8 percent between 1992 and 1993, the largest gain among all measured nonmanufacturing industries. In fact, during the 1973–93 period, commercial banks had the highest long-term growth in productivity than any of the measured finance and services industries.[2] The long-term growth in productivity can be attributed to some extent to the increased use of technology, such as computerization of check handling functions.[3]

Deregulation. Deregulation of interest rates began in 1980, when Congress passed the Depository Institutions Deregulatory and Monetary Control Act. The act gradually abolished restrictions on interest rates over the next 5 years, and also permitted growth of ATM's over State lines.[4] Prior to the act, banks had been subject to a ceiling on the level of interest they could pay depositors. With the elimination of the ceiling, interest rates became a selling point, leading to fierce competition among banks for depositors, which in turn led banks to try to find ways to cut costs and attract customers. The offering of new services such as ATM's was one way of achieving these goals.

Banking technologies

The use of computers in banking first began in the early 1950s, when the first large commercial computer was built for Bank of America.[5] Initially, computers were used to process check transactions through magnetic ink character recognition. With the introduction of the first automated clearinghouse in the early 1970s, elec-

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tronic funds transfer (EFT) was made possible, and the ATM was introduced.[6] Current statistics show that workers in the finance industry use computers more than any other industry. In October 1993, 84.5 percent of all workers in finance (a larger category that includes banking) used a computer.[7] (See chart 1.) Statistics on computer equipment sales show that in 1993, the depository institutions industry (which mainly consists of commercial banks) supplied the 19th largest amount of sales out of 77 industries to computer equipment manufacturers.[8] Banks increasingly have turned toward ATM and other computer technology to reduce the high costs associated with maintaining traditional "brick and mortar" branches staffed by tellers. ATM transactions, along with transactions made by telephone, have replaced transactions formerly made with human tellers.

ATM's. With the introduction of EFT in the early 1970s came the use of ATM's to process financial transactions. The first ATM was installed at a bank in Valdosta, Georgia, in 1971.[9] Initially, ATM's served as cash dispensers, but as customer acceptance increased, EFT networks expanded, and as barriers to interstate installation fell, ATM usage rose. ATM's appeared not only at bank locations but in shopping centers, stadiums, airports, and other locations where people gather. By 1995, 9.7 billion transactions were processed at 123,000 ATM terminals.[10] (See chart 2.) Cash withdrawals remain the most widely used ATM transactions; however, many banks are adding a collection of services to help encourage use of ATM's, because ATM transactions cost less than teller transactions. According the the American Bankers Association, an industry trade group, a teller transaction costs a bank about $1.07, while the same transaction conducted at an ATM would cost 27 cents.[11] In addition, banks receive revenue from ATM transactions, as most charge customers a fee for using an ATM outside their bank's system. As of April 1, 1996, banks have the authority to charge ATM fees to noncustomers who use the bank's ATM. Therefore, customers who access an ATM outside their own bank's system could be subject to ATM fees levied by their own bank as well as by the bank that owns the ATM. Other sources of ATM fees include charges for replacing PIN's (personal identification numbers) and ATM cards.

Banks are adding ATM functions such as on-line loan applications, distribution of mini-statements, dispensing of foreign currency, purchase of traveler's checks, and check cashing to attract customers. They also encourage customers to use ATM's by making other types of transactions more expensive; for example, a Chicago bank charges for transactions involving a human teller if that transaction could have been conducted at an ATM. Some banks offer discounts on services such as checking account fees to customers who agree to use ATM's. All of these incentives are intended to lead customers away from transactions with a human teller.

Point-of-sale transactions. Point-of-sale (POS) transactions at retailers are another use of ATM technology. These transactions are made by swiping an ATM or debit card through a terminal, commonly located in grocery stores, gasoline stations, and convenience stores. In 1995, there were about 554,000 POS terminals located in retail establishments,[12] and POS transactions accounted for just 8 percent of total EFT transactions. In terms of percentage change, however, POS transactions are growing at a much higher rate than ATM transactions, as shown in the following tabulation of over-the-year percentage increases in ATM and POS transactions:[13]

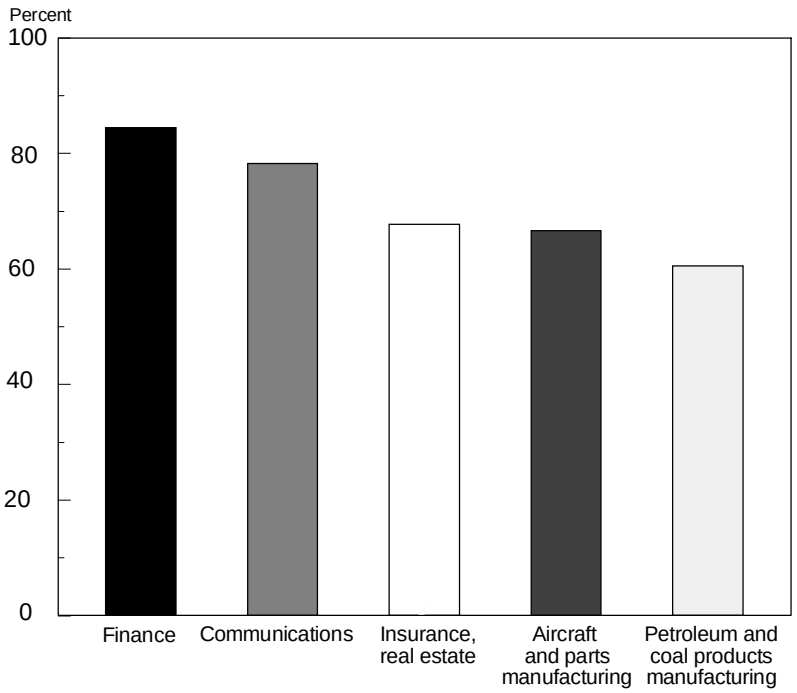
	Percentage increase	
Year	*ATM*	*POS*
1986	2	157
1987	12	67
1988	11	67
1989	14	57
1990	12	22
1991	12	10
1992	12	38
1993	7	49
1994	10	45
1995	15	37

POS transactions can be either on-line or off-line. With an on-line transaction, the customer uses an ATM card and enters a PIN into a keypad, and his or her account is debited immediately. An off-line debit card is associated with a major credit card company and carries the company's logo. Instead of entering a PIN, the customer signs for the purchase, and the sales amount is debited from the customer's account within a few days. Some off-line debit cards also can be used to conduct ATM transactions. Off-line debit cards provide revenue to banks, because some banks charge consumers $10–$15 for a card, and interchange fees paid by retailers are higher than for on-line debit cards.[14]

Telephone transactions. Banking by touchtone telephone has been boosted in recent years by the availability of advanced computer technology. According to the research firm Payment Systems Inc., about one-third of U.S. households conduct a banking transaction over the telephone at least once a month.[15] Telephone technology is an attractive investment for banks, because telephone transactions are a lower cost alternative to transactions with a human teller (the American Bankers Association estimates the cost of a telephone transaction to be 35 cents).[16] Many banks offer an audio response system, in which the customer calls the bank and is able to inquire about balances, transfer funds between accounts, or pay bills.

Several major banks have taken telephone banking a step

Chart 1. **Top five private sector industries ranked by percentage of workers who use a computer at work, October 1993**



SOURCE: U.S. Bureau of the Census.

further, and have established telephone calling centers which are staffed 24 hours a day by bank personnel. Routine requests, such as account balances, are handled by an audio response system, but requests such as opening a credit card account or loan approval are handled by the staff. Some banks charge customers for certain calls to telephone banking centers, typically customers who exceed a monthly quota of calls. Calls handled by personnel at banking centers are estimated to cost $1.82 per transaction, according to the American Bankers Association. Therefore, banks want to minimize the number of calls handled in person and have the staff free for handling complex, and presumably more profitable, interactions.[17] The telephone banking center appears to be quite a growth area, as many major banks have announced plans to open centers or increase their operations of centers, while at the same time closing branches.

A recent innovation in telephone financial transactions involves the use of a screen phone that allows customers to observe transactions. The most recent screen phone models also have advanced features such as e-mail and online shopping. A 1994 American Banker/Gallup Survey found that 47 percent of respondents preferred a screen phone over a regular phone for making banking transactions.[18] Given this interest, several major institutions offer screen phones, but many analysts believe that the price of the phone, which ranges between $99 and $600, is prohibitive to its widespread use.

Mergers and failures

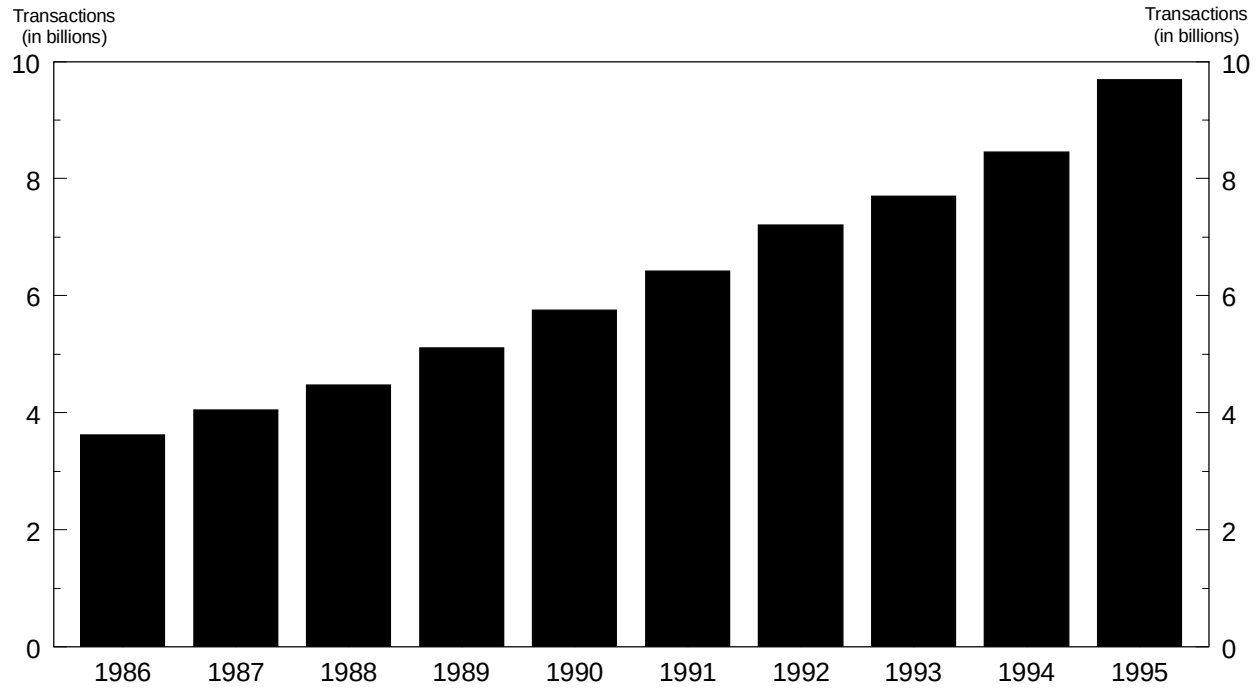
While technology has had an impact on employment in the banking industry, it is not the only cause for the job declines. The numerous mergers and failures that have occurred in the industry also have taken their toll on employment. Mergers among commercial banks rose from 126 in 1980 to 549 in 1994, a fourfold increase.[19] Bank failures also rose during the period, peaking at 203 in 1988; since then, the number of failures has fallen each year.[20] (See chart 3.)

Mergers and consolidations are expected to continue, due to a relaxation in interstate banking laws. The Riegle-Neal Interstate Banking and Branching Act, enacted in 1995, gives national banks authority to branch interstate by merging with existing banks or opening new (de novo) branches in other States. Mergers lead to fewer jobs because as banks are merged, duplicate jobs are eliminated and like operations are consolidated. The 1995 merger of Chemical Bank with Chase Manhattan is an example of the continuing merger trend.

Competition with 'non-banks'

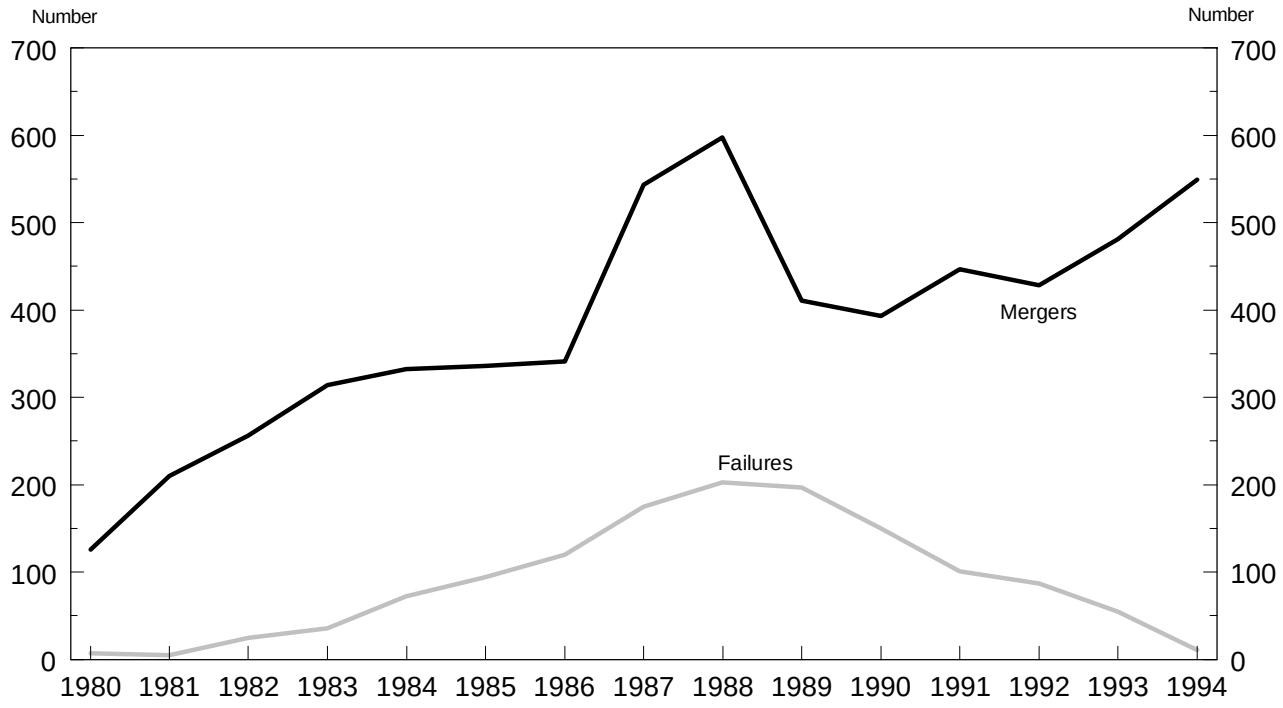
Besides reductions due to technology and mergers, growth in the banking industry has been restrained by competition from non-bank institutions, such as Merrill Lynch, a brokerage firm. The reduction in the cost of providing banking services due to improvements in technology served as an impetus for non-banks to enter the banking services market. The non-banks offer financial services such as money market accounts, cash management accounts, investment funds, credit cards, and insurance. These institutions offer more financial services than banks are allowed to offer, and are subject to less regulation than are banks.[21] Competition from non-bank companies has resulted in less of the Nation's wealth being held by banks. The share of the Nation's assets held by commercial banks declined to 23 percent in 1994, down from 37 percent 15 years earlier.[22] The loss of funds to non-bank entities is yet another reason why commercial banks have invested in technology in

Chart 2. **Transactions at ATM terminals, 1986–95**



SOURCE: *Bank Network News* (Chicago, Faulkner and Gray, 1995).

Chart 3. **Mergers and failures among FDIC-insured commercial banks, 1980–94**



SOURCE: U.S. Federal Deposit Insurance Corporation (FDIC), *Statistics on Banking* annual.

order to offer more and better services and to increase labor efficiency.

Employment in banks

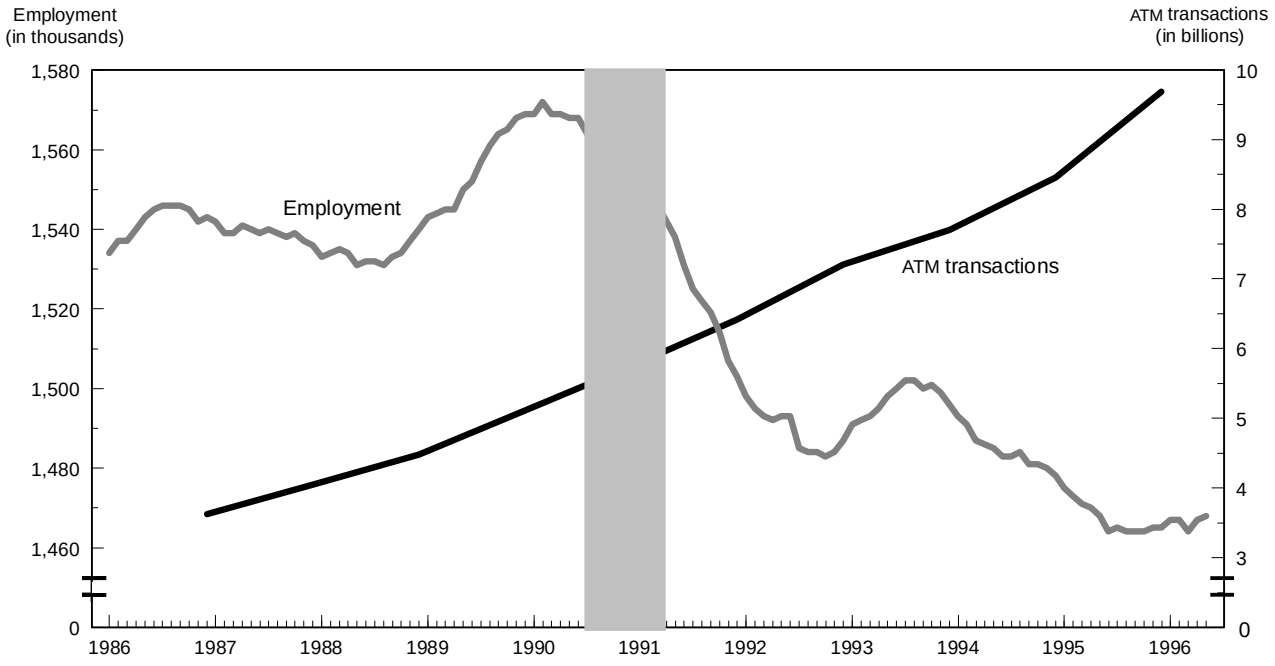
Trends. Statistics from the Bureau of Labor Statistics Current Employment Statistics program show that employment in commercial banks currently is 1.5 million, a decline of 70,000 over the past 10 years. Employment rose in late 1988, peaked in February 1990, then fell by 89,000 until a trough was reached in October 1992, a period which included the 1990-91 recession. Employment grew slowly until a peak was reached in August 1993, and has been on a downward trend since. The number of employees now is 100,000 below the all-time high reached in Februry 1990. (See chart 4.) The commercial banking industry is one of the few private service-producing industries that lost employment during the past 10 years. Most industries in the service-producing sector side of the economy have been on a growth trend as the economy has expanded. Only the savings institutions industry (a small component within depository institutions) and the railroad transportation industry shed more jobs than did commercial banks during the 1986–96 period. The savings institutions industry contains thrift institutions, which underwent numerous failures and mergers in the late 1980s.

The decline in banking employment over the past 10 years stands in sharp contrast to the continuing growth in ATM volume. There may be a strong correlation between the increased use of ATM's and the drop in the number of jobs in this industry. ATM's have contributed to a decline in the number of employees needed to process checks and a reduction in the number of customers that enter a bank to process transactions with tellers. ATM's, however, are not the only technological advances that resulted in the need for fewer bank employees. The evolution of direct deposit of paychecks and benefit checks has contributed to a decline in check-cashing transactions at the teller window.

Estimates of employment in specific occupations are available from the Current Population Survey (CPS).[23] These data show that the number of bank tellers fell by 41,000 between 1985 and 1995. Most of the positions for tellers that remain are being converted to part-time positions, which cost banks less because part-time tellers generally receive fewer benefits than full-time tellers. Shifting to part-time tellers also allows banks more flexibility to extend business hours; tellers can be scheduled to work only when customer traffic is high.

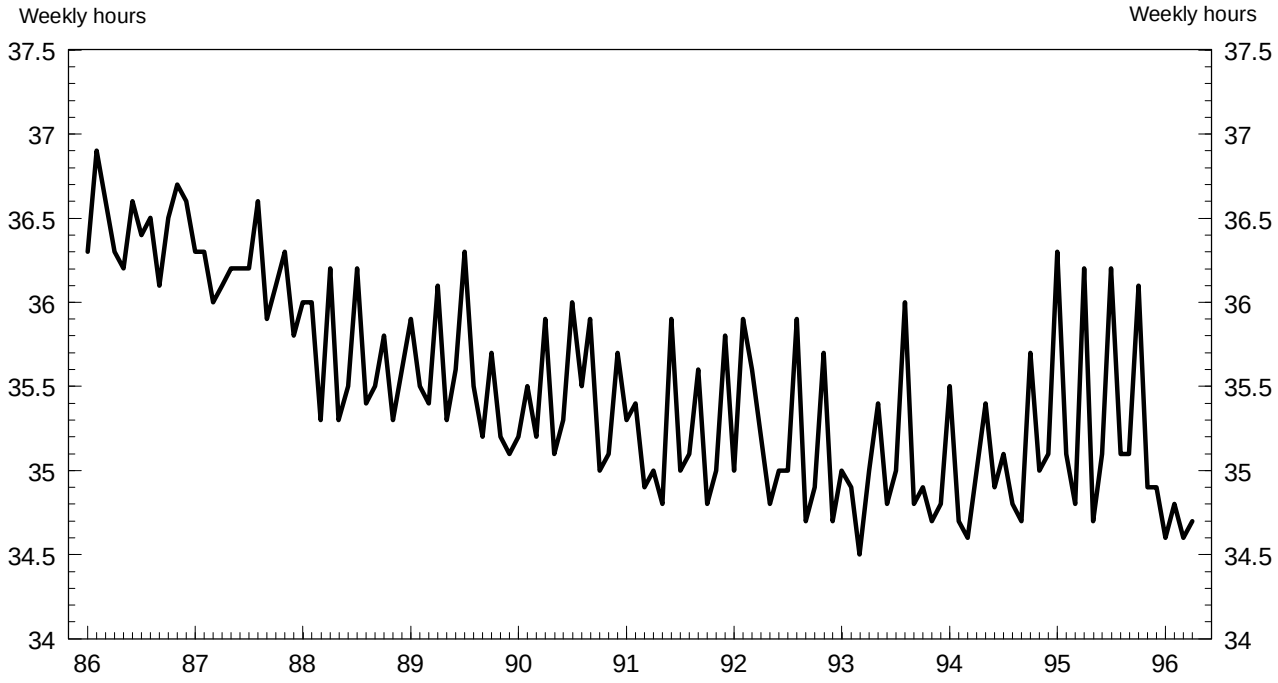
It is likely that the trend toward replacing full-time tellers with part-time tellers has prevented employment in the bank-

Chart 4. Employment in commercial banks, seasonally adjusted, and number of ATM transactions, 1986–96



NOTE: The shaded area denotes a recession, as identified by the National Bureau of Economic Research.
SOURCES: Unpublished data from the Bureau of Labor Statistics Current Employment Statistics program; and *Bank Network News.*

Chart 5. Average weekly hours worked by nonsupervisory workers in commercial banks, not seasonally adjusted, 1986–96



SOURCE: Bureau of Labor Statistics Current Employment Statistics program.

ing industry from declining further than it has. Because the Current Employment Statistics survey counts full-time and part-time positions equally, if a bank eliminated full-time teller positions and created part-time positions, the bank's employment of tellers could remain the same or perhaps increase. Data on average weekly hours for nonsupervisory workers in commercial banks are available from the Current Employment Statistics program. These data show that since January 1986, average weekly hours worked by nonsuper-visory workers in commercial banks have fallen from 36.3 hours to 34.7 hours. (See chart 5). The decline in hours would likely be larger if there were not other types of banking positions included in the nonsupervisory workers category. According to the CPS, employment of bank tellers accounts for about one-quarter of employment within commercial banks. Clearly, there are many other types of positions included in nonsupervisory workers that would not be subject to increased part-time schedules, such as customer service representatives at telephone banking centers.

Outlook. BLS projections of employment trends for the banking industry show declines in employment, specifically among bank tellers. Projections are not made separately for the commercial banking industry, but are available for the broader category, depository institutions (about three-fourths of the industry's employment is in commercial banks). The projections show an expected decline of 0.9 percent annually in employment within depository institutions between 1994 and 2005, for a total decline of 10.4 percent.[24] During the same period, the number of bank tellers is expected to decline 27 percent, as bank branches close, mergers continue, and non-teller transactions increase.[25]

BLS projections of real output also show an increase for depository institutions; real output is projected to rise 2 percent annually between 1994 and 2005.[26] The increasing use of technology will allow banks to continue to provide services while shedding jobs.

COMPUTER TECHNOLOGY is used by commercial banks to reduce costs and survive the competition. Consumer acceptance of ATM's and touchtone telephones to make financial transactions has allowed banks to reduce the number of costly transactions made with human tellers. Subsequently, banks have reduced the employment of tellers and have converted many of the remaining teller positions into part-time jobs. In the future, commercial banks are expected to achieve a rise in real output, while providing more services with fewer employees. □

Footnotes

[1]James B. Shanahan, "ATM Revolution Keeps Marching On," *The American Banker,* Nov. 27, 1995, p. 2A.

[2] *Productivity By Industry, 1993 and 1994,* USDL 96–15 (Bureau of Labor Statistics, Jan. 30, 1996). The latest year available for commercial banks is 1993.

[3] *Productivity Measures for Selected Industries and Government Services,* Bulletin 2461 (Bureau of Labor Statistics, May 1995), p. 7.

[4] Stephen Koepp, "Banking Takes a Beating," *Time,* Dec. 3, 1984, p. 48.

[5] Martin Mayer, "The Humbling of BankAmerica," *The New York Times,* May 3, 1987, p. 27.

[6] For further reading on computerization in the banking industry, see *Technology and Labor in Oil and Gas Extraction and Commercial Banking,* Bulletin 2432 (Bureau of Labor Statistics, October 1993).

[7] Bureau of the Census, *Computer Use in the United States: October 1993,* Table 7.

[8] Input/Output Matrix, Bureau of Labor Statistics, Office of Employment Projections.

[9] Harry Waddell, "C&S Retires its First ATM After 233,000 Transactions," *ABA Banking Journal,* June 1981, p. 14.

[10] *Bank Network News* (Chicago, Faulkner and Gray, 1995).

[11] Jonathan D. Glater and Frank Swoboda, "Taking a Bite Out of Bank Jobs; In the Quest for Convenience and Lower Costs, ATMs Eat Into Services Provided by Tellers," *The Washington Post*, July 10, 1995, p. F1.

[12] *Bank Network News*.

[13] *Ibid*.

[14] Valerie Lilley, "Latest Deal: Debit Cards; Consumers Who Hold Them Shop in Stores Where They Can Play Them," *The Sun-Sentinel,* Aug. 13, 1995, p. 1F.

[15] *Consumer Trends and Opportunities in Financial Services Distribution Systems* (Payment Systems Inc., Fall 1995), p. 124. Payment Systems Inc. is an automated clearinghouse association in Tampa, Florida, that conducts research on EFT issues and assists banks and corporations in the southeastern United States with educational and marketing initiatives.

[16] Diane Mastrull, "There is a Growing Interest in Banking Over the Phone," *Philadelphia Business Journal,* May 5, 1995, p. 3.

[17] Jeanne Brokaw, "Some Banks Are Ringing Up Fees For Heavy Use of Phone Services," *The American Banker*, Dec. 4, 1995, p. 1.

[18] Tracy Tucker, "Screen Phones are Seen as an Easier Sell for Home Banking than More Complex PC's," *The American Banker*, Dec. 27, 1994, p. 1.

[19] Data are from the Federal Deposit Insurance Corporation, Statistics on Banking.

[20] *Ibid.*

[21] Banks are subject to laws concerning equal lending and community development that do not apply to non-bank financial entities. Banks also are subject to the regulations of the Glass-Steagall Act, which prohibits banks from engaging in insurance or investment banking activities that are not necessary to carry out the business of banking.

[22] Karen Kahler Holliday, "It's Time to Take Action, Commercial Banks," *Bank Marketing*, June 1995, p. 41.

[23] The Current Population Survey is a monthly survey of about 50,000 households, conducted by the Bureau of Census for the Bureau of Labor Statistics.

[24] James C. Franklin, "Industry Output and Employment Projections to 2005," *Monthly Labor Review*, November 1995, p. 55.

[25] George T. Silvestri, "Occupational Employment to 2005," *Monthly Labor Review*, November 1995, p. 82.

[26] Franklin, "*Industry Output and Employment Projections to 2005,*" p. 52.